

SECOND CHECKLIST OF MONTANA MOSSES (DRAFT)

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I. INTRODUCTION

The First Checklist of Montana Mosses (Eversman and Sharp 1980) was compiled from specimens in the Montana State University Herbarium, published reports, and collections of the authors. Since the initial checklist, species not previously known from Montana have been discovered, range extensions have been documented, and taxonomic revisions have been made.

This checklist was compiled from species at the University of Montana Herbarium (MONTU), published reports, unpublished collection records, and specimens that I collected or obtained from other botanists, primarily Gerald Moore, Peter Lesica, Bruce McCune, and Ken Scow. S. Flowers' Montana collections, deposited at the University of Colorado Herbarium (COLO), are included in this checklist. Some Montana collections of Dale H. Vitt also are included in this checklist. Taxonomic nomenclature essentially follows Ireland et al. (1987).

Mosses known for Montana, habitat and substrate characteristics, abundance, and known geographic range in Montana are briefly discussed in this report. The status of mosses relative to rarity, limited distribution, or limited collections is noted. Literature relevant to interpreting taxonomy, ecology, distribution, and conservation status has been reviewed and cited, where appropriate.

II. LITERATURE REVIEW

The moss flora of Montana, although not comprehensively studied, has been reported by Eversman and Sharp (1980) to include 328 species distributed among 116 genera and 40 families. Most of the collections cited by these authors are from the western, mountainous portions of the state.

The earliest Montana moss records were published by Williams (1902) from collections made in and around Glacier National Park (GNP) and in the Belt Mountains during 1895-1897. Jones (1910) reported mosses and liverworts collected from GNP in 1893. Hermann (1969) identified approximately 300 mosses from GNP. Andrus and Layser (1976) reported nine *Sphagnum* species for Montana, four which were new state records. McCune (1979) reported 137 moss species from the Swan Valley (portions of Lake and Flathead counties) of northwestern Montana. His collections of *Brachythecium leibergii* Grout, *Rhyncostegium serrulatum* (Hedw.) Jaeg. & Sauerb. from the Swan Valley, and *Lescuraea stenophylla* (Roll) Kindb. are the first records for the state.

Churchill (1983) studied the moss flora of the Great Plains of eastern Montana. He collected 57 species from the eastern one-third of the state, three being new state records. Lesica (1986) investigated the flora of Pine Butte Swamp, a minerotrophically rich fen, in a relatively dry climatic region of Montana. He concentrated on the vascular flora, but also found mosses indicative of rich fens (Slack *et al.* 1988).

Elliott and Moore (1989) reported 21 mosses new to Montana and noted their geographic distributions in North America. Vitt *et al.* (1988) discussed habitat characteristics, taxonomic features, and known ranges in western North American for selected mosses.

Lesica *et al.* (1990) studied differences in lichen and bryophyte communities between old growth and managed second growth forests in the Swan Valley. Their study suggests that many lichens and bryophytes find optimum habitat in old growth forests and become less common as silvicultural practices continue to convert old growth to younger forests.

McCune and Antos (1982) studied the ecology of epiphyte communities in coniferous forests of the Swan Valley. They reported the presence of mosses found on tree trunks. These authors (1981 and 1981a) also reported mosses associated with forest layers in the Swan Valley.

Vitt (1973 and 1991) reported the distribution of genus *Orthotrichum* in North America and identified collection records in Montana for this genus. Vitt (1990) also mapped the distribution of *Seligeria donniana* in North America including one location for this rare moss in north-central Montana. Vitt and Belland (1991) mapped the distribution of *Dryptodon patens* in North America, including a collection from Carbon County, the easternmost station in western North America.

Marino (1988) mapped the distribution of *Tetraplodon angustatus* in North America. This circumboreal moss is known from one location in Montana in Lewis and Clark County, the southernmost station in western North America.

One location of the rare "copper moss," *Mielichhoferia macrocarpa*, is known from Park County near Silver Gate (Brassard and Hederson 1983). This arctic-alpine species, one of the rarest mosses in North America, is known from Montana, Colorado, and Utah, two stations in Canada, and several arctic locations.

Lesica and McCune (1989) established permanent transects at three alpine sites in Glacier National Park to study global warming. They recorded vascular plants, lichens, and bryophytes. Two of 22 mosses on their transects appear to be new records for Montana (*Drepanocladus brevifolius* and *Hyphnum bambbergii*).

A new species, *Bryum calobryoides*, was described by Spence (1986). This montane species is known from one 1896 collection by Williams (1902) near Columbia Falls.

Essential references for identifying Montana mosses have been authored by Lawton (1971) and Crum and Anderson (1981). These comprehensive references provide taxonomic keys, line drawings, and descriptions of distribution and habitat. Other useful references include Vitt *et al.* (1988), Flowers (1973), Ireland (1982), Conard and Redfearn (1979), and Crum (1973). Publications addressing peat mosses (*Sphagnum*) include Vitt and Andrus (1977), Andrus (1980), McQueen (1990), and Crum (1988).

III. BIOGEOGRAPHIC DISTRIBUTION

The moss flora of Montana is composed of species exhibiting circumpolar, circumboreal, Pacific maritime, arctic-alpine, and widespread biogeographic distribution patterns. A few species are endemic to the Northwest (e.g., *Roellia roellia*, *Rhytidopsis robusta*, *Buxbaumia piperi*, *Dichodontium pellucidum*, *Heterocladium dimorphum*, and *Herzogiella seligeri*) and one species, *Grimmia brittoniae*, is endemic to northwestern Montana. Several species are cosmopolitan (e.g., *Bryum argenteum*, *Bryum caespiticium*, *Ceratodon purpureus*, *Funaria hygrometrica*, *Hedwigia ciliata*, and *Leptobryum pyriforme*).

The maritime influence of the Pacific Ocean on plant distribution in Montana has been discussed by McCune (1984). Moist coastal weather patterns influence the climate of approximately one-third of western Montana. Characteristic Pacific maritime mosses include *Antitrichia californica*, *Barbula vinealis*, *Brachythecium frigidum*, *Claopodium bolanderi*, *Homalothecium aeneum*, *Metaneckera menziesii*, *Oligotrichum aligerum*, *Scolelochia aquatica*, *Scleropodium obtusifolium*, *Heterocladium dimorphum*, *Rhytidadelphus squarrosus*, and *Fissidens grandifrons*.

Arctic-alpine mosses are restricted to high elevations in Montana mountains, but usually grow at lower elevations at higher latitudes. The southward extensions of these species into the Rocky Mountains is associated with refugia that existed during the last glaciations (Schofield 1980). Montana mosses with this distribution pattern include *Paraleucobryum enerve*, *Andreaea rupestris*, *Bartramia ithyphylla*, *Dicranum acutifolia*, *Grimmia incurva*, and *Conostromum tetragonum*.

The largest group of Montana mosses is circumboreal in distribution, occurring southward in Montana in cool, moist, coniferous habitats. Species of this group include *Atrichum undulatum*, *Aulacomnium androgynum*, *Brachythecium salebrosum*, *Dicranum scoparium*, *Drepanocladus uncinatus*, *Hylocomium splendens*, *Hypnum cupressiforme*, *Pleurozium shreberi*, *Pohlia nutans*, *Polytrichum commune*, *Polytrichum juniperinum*, *Ptilium crista-castrensis*, and *Rhytidadelphus triquetrus*.

Mosses with circumpolar distributions often are found in cool, moist habitats of fens and bogs. Such sites were abundant following the continental glaciers, but are relatively uncommon in Montana. Circumpolar mosses include *Aulacomnium palustre*, *Calliergon giganteum*, *Campylium stellatum*, *Cinclidium stygium*, *Climacium dendroides*, *Cratoneuron commutatum*, *Drepanocladus exannulatus*, *Hygrohypnum ochraceum*, *Hypnum lindbergii*, *Meesia triquetra*, *Palludella squarrosa*, *Scorpidium scorpioides*, *Sphagnum capillaceum*, *Sphagnum angustifolium*, and *Tomentypnum nitens*.

IV. RARE, THREATENED, AND ENDANGERED MOSSES

The Conservation Status (rarity, extinction risk, and need of special protection) of mosses in most of the United States is poorly known although a few states have lists of rare, threatened, and endangered mosses (e.g., Oregon, Idaho, New York, Missouri, Delaware, and New Jersey). Mosses often have not been included on lists of special status plants because moss floras of few states have been adequately studied; herbarium records are incomplete, unreliable, and must be verified by experts; taxonomy is difficult; and some mosses are ephemeral, small, and easily overlooked (Andrus and Karlin 1989, Janssens 1988, Clements and Ketchledge 1990). Clements and Ketchledge (1990) expressed the opinion that the apparent rarity of some mosses may be "merely a measure of scarcity of bryologists" collecting and depositing mosses at herbaria.

Andrus and Karlin (1989) suggest that perhaps only the states of Colorado, Louisiana, Michigan, Missouri, New York, North Carolina, and Ohio may have been sufficiently studied to rank mosses for rarity or needing protection. Montana, particularly the central and eastern portions of the state, has not been adequately studied to compile a list of special status mosses. Many mosses are known from less than 3 locations in the state with 82 taxa (approximately 20 percent) known from only 1 station in Montana.

In spite of data limitations, I have noted the apparent rarity of mosses. Species are identified which appear to be restricted to rare habitats, are rarely collected regional endemics, are present in Montana at the margins of their ranges, or have been reported by experienced bryologists to be rare in Montana or the Rocky Mountain West.

V. CHECKLIST

Mosses are arranged alphabetically without regard for systematic arrangement into classes, orders, or families. Annotations for species are as follows: biogeographic distribution and/or substrate; known distribution in Montana (usually by county); conservation status; and comments.

Information on classification can be found in Ireland *et al* (1987), Lawton (1971), Anderson *et al*. (1990), and Weber and Wittman (1992). In general, these authors classify mosses consistently among families, but sometimes differ on generic and specific names. This checklist includes 408 taxa consisting of 385 species, 21 varieties, 2 forms, and 1 subspecies.

Mosses not previously reported for Montana are preceded by an asterisk. These mosses generally are unreported collections from MONTU and COLO. New Montana records included in this checklist are: *Antitrichia curtipendula* var. *gigantea*, *Bartramia stricta*, *Brachythecium populeum*, *Bryum bicolor*, *B. cyclophyllum*, *Calliergon richardsonii*, *Calliergonella cuspidata*, *Claopodium crispifolium*, *Dicranum angustum*, *D. fragilifolium*, *Ditrichum heteromallum*, *D. pusilla*, *Euryhynchium pulchellum* var. *barnesii*, *E. riparioides*, *Fontinalis antipyretica* var. *gigantea*, *F. antipyretica* var. *oregonensis*, *F. patula*, *Grimmia laevigata*, *Hygrohypnum cochlearifolium*, *H. durisculum*, *Hypnum procerrimum*, *H. recurvatum*, *Kiaeria falcata*, *Neckera douglasii*, *Orthotrichum praemorsum*, *Platygyrium repens*, *Porotrichum bigelovii*, *Rhacomitrium ericoides*, *R. heterostichum* var. *microcarpon*, *R. occidentale*, *R. varium*, and *Tortula papillosa*.

Montana Mosses

Aloina brevirostris (Hook. & Grev.) Kindb.

Calcareous soil; Cascade and Flathead; Rare; Pioneer species on roadcuts and riverbanks. Known from 1896 specimen at "Lower Falls of Missouri River" (Williams 1902). This station may have been destroyed by mainstem dams on the Missouri River.

A. rigida (Hedw.) Limpr.

Exposed soil, especially roadcuts in open conifer and prairie habitats; Fallon and Roosevelt; Crum and Anderson (1982) considered this moss "rare and scattered" in eastern North America. Churchill (1983) reported it "frequent from the High Plains proper." It is probably relatively common in eastern Montana and rare in western Montana.

Amblyodon dealbatus (Dicks.) B.S.G.

Fens and other wetlands, often calcareous; Flathead; Rare; Known from 1897 collection by R.S. Williams (1902) from "Columbia Falls."

Amblystegium humile (P. Beauv.) Crundw.

Wet soil, rock, and wood; Gallatin, Lake, and Ravalli; Status unknown.

A. *noterophilum* (Sull. & Lesq. ex Sull.) Holz.

Submerged in springs; Cascade and Flathead; Rare; Williams (1902) reported this moss from Giant Springs at Great Falls. I have subsequently collected it from this same location. McCune (1979) reported it from the Swan Valley.

A. *riparium*. (Hedw.) B.S.G.

Submerged rocks in warm springs and calcareous seeps; Gallatin, Granite, Lake, Lewis and Clark, Powder River, and Powell; Common.

A. *serpens*. (Hedw.) B.S.G.

Wet soil and rotten wood; Most Montana counties; Common.

A. *serpens* var. *juratzkanum* (Schimp.) Rau and Herv.

Wet soil and rotten wood; Widespread in Montana; common.

A. *tenax* (Hedw.) C. Jens.

Submerged or floating in springs, often warm springs; Gallatin, Granite, Madison, and Powell; Uncommon in Montana; Elliott and Moore (1989) reported it from 3 warm springs.

A. *varium* (Hedw.) Lindb.

Damp soil, rock, and wood; Flathead; Probably common; A highly variable species probably overlooked or misidentified because it is not included in the Moss Flora of the Pacific Northwest by Lawton (1971).

Amphidium lapponicum (Hedw.) Schimp.

Moist rock, often calcareous at high elevations; Cascade, Flathead, GNP, and Lincoln; Status unknown; Vitt et al. (1988) considered it to be infrequent, occurring in western and coastal mountains.

A. *mougeotii* (B.S.G.) Schimp.

Moist, acidic rock; GNP; Status unknown.

Anacolia menziesii (Turn.) Par.

Pacific maritime; rock and soil; Flathead, Lake, and Lincoln; Infrequent in Montana, but common west of the Cascade Range. Restricted to northwestern Montana. Flowers (1973) considered it rare in Utah.

Andreaea rupestris Hedw.

Circumpolar, acidic rocks and seeps; GNP and Ravalli; Infrequent; Known from 6 stations in GNP (Hermann 1969) and D.H. Vitt collection (ALTA) near Skalkaho Pass; Crum and Anderson (1982) considered this moss a pioneer on boulders and cliffs.

Antitrichia californica Sull. ex Lesq.

Pacific maritime, on trees, logs, and rocks; Cascade, Flathead, GNP, Lincoln, and Ravalli; Infrequent.

A. *curtipendula* (Hedw.) Brid.

Pacific maritime, on trees, logs, and rocks; Flathead, GNP, Lake, Lincoln, and Ravalli; Uncommon, at the margin of its range in Montana. This moss is sometimes abundant, dominating the understory ground cover (Vitt *et al.* 1988).

*A. *curtipendula* var. *gigantea* L. & J.

Dry rock; Lake; Status unknown; Known from S. Flowers' collection deposited at COLO (#10,122).

Atrichum selwynii Aust.

Soil, often on overturned tree roots; Cascade, Chouteau, Flathead, Lake, Lincoln, and Ravalli; Common.

A. *undulatum* (Hedw.) P. Beauv.

Pacific maritime, acidic soil often on trail banks and overturned tree roots; Lincoln; Common; Lawton (1971) does not consider this species to occur in Montana and reports that it is rarely collected in North America.

Aulacomnium androgynum (Hedw.) Schwaegr.

Trees, rotten logs, and humus; Cascade, Flathead, Gallatin, GNP, Granite, Lake, Madison, Missoula, and Sanders; Infrequent; Vitt *et al.* (1988) reported distribution as mostly Pacific coastal, often growing on burnt stumps.

A. *palustre* (Hedw.) Schwaegr.

Wet soil and humus in bogs and fens; Widespread throughout Montana; Common; A dominant species in both rich and poor fens.

Barbula brachyphylla Sull. in Whipple.

Soil over rock; GNP; Status unknown; Schofield (1980) described this moss as a western montane species of relatively dry habitats.

B. *convoluta* Hedw.

Soil and rock; GNP and Lake; Status unknown.

B. *eustegia* Card. and Ther.

Soil; Flathead and Lake; Status unknown.

B. *unguiculata* Hedw.

Soil and walls, usually in calcareous areas; Carter, Cascade, and Roosevelt; Rare in the Pacific Northwest (Lawton 1971). Appears to be more common in eastern Montana (Churchill 1983).

Bartramia ithyphylla Brid.

Circumpolar, exposed organic soil in alpine tundra; Cascade, Flathead, GNP, and Lake; Infrequent.

B. pomiformis Hedw.

Soil and soil over rock; Flathead, GNP; Lake, and Lincoln; Infrequent; Sometimes called the "apple moss" because the round capsules resemble green apples (Vitt *et al.* 1988).

**B. stricta* Brid.

Soil over rock at high elevations; GNP; Rare; W.B. Schofield collection from Logan Pass is deposited at MONIU.

Blindia acuta (Hedw.) B.S.G.

Wet rock and tundra at high elevations; Flathead and GNP; Rare; An acidophile growing in wet, shaded habitats (Crum and Anderson 1981).

Brachythecium acutum (Mitt.) Sull.

Rotten wood and humus; Flathead; Status unknown; Crum and Anderson (1981) considered this species to be a form of *B. salebrosum*.

B. albicans (Hedw.) B.S.G.

Rocky, sandy soil and humus, often on relatively dry, disturbed sites; Beaverhead, Flathead, GNP, Hill, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Phillips, Powder River; Common.

B. collinum (Schleich. *ex* C. Mull.) B.S.G.

Soil and soil over rock; Beaverhead, Carter, Cascade, Custer, GNP, Lewis and Clark, Lincoln, McCone, Missoula, Phillips, and Powder River; Common.

B. erythrorrhizon B.S.G.

Soil and humus; Cascade, Flathead, GNP, and Lewis and Clark; Status unknown. This species is often emergent in streams and along stream banks (Vitt *et al.* 1988).

B. frigidum (C. Mull.) Besch.

Pacific maritime, often emergent from springs; Cascade, Flathead, GNP, Judith Basin, Lewis and Clark, Lincoln, Missoula, Ravalli, and Sanders; Common.

B. hylotapetum B. Hig. & N. Hig.

Pacific maritime, soil, humus, and rotten wood; Flathead, GNP, Lake, Lewis and Clark, Lincoln, and Missoula; Common; Often in association with *Rhytidopsis robusta* under old growth conifer forests.

B. leibergii Grout

Pacific maritime, soil, and rotten wood; Lake and Missoula; Status unknown; Known from a McCune (1979) collection from the Swan Valley and S. Flowers' collection deposited at COLO.

B. nelsoni Grout

Pacific maritime, wet organic soil; GNP; Status unknown; Known from Hermann (1971) collection near Kintla Lake.

B. oxycladon (Brid.) Jaeg. and Sauerb.

Soil with pine needles; Carter; Rare; reported by Churchill (1983) from near Camp Crook.

B. plumosum (Hedw.) B.S.G.

Wet rock, usually near streams; Flathead, Madison, and Ravalli; Status unknown.

**B. populeum* (Hedw.) B.S.G.

Rock and soil; Granite; Status unknown; Known from L.H. Harvey collection deposited at MONTU.

B. reflexum (Starke ex Web. & Mohr.) B.S.G.

Tree bases, rock, and soil; Cascade and Flathead; Status unknown; Known from 1896 collections of Williams (1902).

B. rivulare B.S.G.

Wet soil and rocks near streams, often emergent from water; Beaverhead, Fergus, Flathead, GNP, Lake, Lincoln, and Madison; Common; A variable species often confused with *B. frigidum* which occupies similar habitat.

B. rutabulum (Hedw.) B.S.G.

Moist soil, rock, and wood; Status unknown; A taxonomically difficult species which may be confused with *B. salebrosum* (Crum and Anderson 1981).

B. salebrosum (Web. & Mohr.) B.S.G.

Rotten wood and humus in coniferous forest; Cascade, Fallon, Flathead, Gallatin, GNP, Golden Valley, and Lake; Common.

B. starkei (Brid.) B.S.G.

Soil, humus, and rotten wood; GNP and Lake; Status unknown. Appears to be an eastern species, not occurring in Montana. Montana reports may be *B. rutabulum* or *B. frigidum*.

B. turgidum (C.J. Hartm.) Kindb.

Wet soil or rocks in alpine and subalpine calcareous meadows and fens (Vitt et al. 1988); GNP; Rare: Hermann's (1969) collection was partially submerged in a tundra pool.

B. velutinum (Hedw.) B.S.G.

Soil, humus, and rotten wood; Custer, Lake, and Missoula; Status unknown.

Bryoerethrophyllum recurvirostrum (Hedw.) Chen

Soil and rock, often calcareous; Fallon, Flathead, GNP, Lake, Lewis and Clark, Lincoln, Madison, Phillips, and Ravalli; Common.

Bryum algovicum Sendn. ex C. Mull.

Soil and rock, often calcareous; Cascade, Flathead, and GNP; Common.

B. alpinum With.

Soil; GNP; Status unknown; Reported by Williams (1902) as *B. alpinum* Huds.

B. arcticum (R. Br.) B.S.G.

Soil and rock at high elevations; Flathead and GNP; Hermann (1969) considered this moss rare in GNP.

B. argenteum Hedw.

Soil, rock, sidewalks, and walls; Throughout Montana; Common; A pioneer species at all elevations.

**B. bicolor* Dicks.

Damp rock; Lake; Rare; Known from S. Flowers' collections deposited at COLO (#6661 and #10,105). Spence (1988) reports that this species (*Bryum dichotomum*) is scattered, but probably widespread throughout western North America.

B. caespiticium Hedw.

Soil, often disturbed sites; Widespread; Common.

B. calobryoides Spence

Wet rock, usually at high elevations, but also reported from warm springs (Spence 1986); Rare; This species was described by Spence (1986) from an R.S. Williams' 1896 collection.

B. calophyllum R. Br.

Wet soil; GNP; Rare; Known from R.S. Williams' (1902) collection.

B. capillare Hedw.

Moist soil, humus, and rotten wood; Cascade, Chouteau, GNP, Lake, and Ravalli; Common.

**B. cyclophyllum* (Schwaegr.) B.S.G.

Wet rock at high elevations; Lake; Status unknown; Known from S. Flowers' collections deposited at COLO (#6632 and #10,097).

B. gemmiparum DeNot.

Wet soil, usually calcareous; Cascade, Flathead, and GNP; Considered rare in GNP by Hermann (1969).

B. lonchocaulon C. Mull.

Moist, peaty soil; GNP; Hermann (1969) considered it rare in GNP and Flowers (1973) reported it uncommon in Utah. Species not described by Lawton (1971) or Crum and Anderson (1981).

B. lisae var. *cuspidata* (B.S.G.) Marg.

Soil; Flathead, GNP, and Lake; Common.

B. muhlenbeckii B.S.G.

Wet soil and rock, often near streams; GNP and Ravalli; Status unknown.

B. pallens (Brid.) Sw. ex Rohl.

Moist soil and soil over rock; GNP; Considered by Hermann (1969) to be infrequent in GNP (Hermann 1969).

B. pallescens Schleich. ex Schwaegr.

Moist soil and rock; Cascade, Chouteau, Flathead, GNP, Lake, Madison, Missoula, Ravalli, and Teton; Common.

B. pseudotriquetrum (Hedw.) Gaertn.

Damp soil and humus; Beaverhead, Fergus, Flathead, GNP, and Lake; Common; Characteristic of rich fens.

B. pseudotriquetrum var. *bimum* (Schreb.) Lilj.

Soil and soil over rock; Flathead and Lake; Status unknown.

B. schleicheri Schwaegr.

Pacific maritime, wet tundra, and rock at high elevations, often near snowfields; GNP; Rare; First reported for Montana by Elliott and Moore (1989).

B. turbinatum (Hedw.) Turn.

Wet soil, usually at high elevations; Cascade, Flathead, GNP, and Park; Infrequent; Similar to *B. schleicheri*, but with continental rather than coastal distribution.

B. uliginosum (Brid.) B.S.G.

Wet soil; Cascade, Flathead, and Lewis and Clark; Status unknown; A poorly known species (Spence 1988).

B. weigelii Spreng.

Wet soil and humus; Beaverhead, Flathead, GNP, Lake, Lewis and Clark, Park, and Teton; Common.

Buxbaumia piperi Best

Pacific maritime, rotting logs; Flathead, GNP, Lake, and Lincoln; Rare; Endemic to the Pacific Northwest. Associated with old growth cedar-hemlock forests.

B. viridis (DC.) Moug. & Nestl.

Soil and rotten wood; Flathead, GNP, Lake, and Missoula; Rare.

Callicladium haldanianum (Grev.) Crum.

Rotten wood and soil; Flathead; Rare; Known from R.S. Williams' collection (1902).

Calliergon cordifolium (Hedw.) Kindb.

Circumboreal, wet soil, and humus; Beaverhead, Flathead, GNP, Lake, Lincoln, and Ravalli; Common.

C. giganteum (Schimp.) Kindb.

Circumboreal, very wet organic soil often submerged; Cascade, Flathead, GNP, Lake, Lincoln, and Teton; Common; Similar to *C. cordifolium*, but usually growing on wetter sites.

**C. richardsonii* (Mitt.) Kindb. ex Warnst.

Circumboreal, wet soil at high elevations; GNP; Rare; Known from W.B. Schofield's collection deposited at MONTU.

C. sarmentosum (Wahlenb.) Kindb.

Circumboreal, wet soil at high elevations; Beaverhead and GNP; Rare in GNP (Hermann 1969).

C. stramineum (Brid.) Kindb.

Circumboreal, wet soil in fens and bogs; Beaverhead, GNP, Lincoln, and Park; Unknown status; Often intermixed with *Sphagnum*.

C. trifarium (Web. & Mohr.) Kindb.

Circumboreal, extremely rich calcareous fens; GNP; Rare; Often found as isolated strands with *Scorpidium scorpioides* (Vitt et al. 1988).

**Calliergonella cuspidata* (Hedw.) Loeske.

Circumboreal, wet soil, and rock; Madison; Rare; Known from P. Lesica's collection at Potosi Hot Springs; deposited at MONTU (s.n.).

Campylium chrysophyllum (Brid.) J. Lange

Soil, humus, rock, and tree bases; Carter, Cascade, Fergus, Flathead, GNP, Granite, and Lewis and Clark; Common.

Campylium halleri (Hedw.) Lindb.

Rock, soil, and tree bases; Flathead and GNP; Considered rare by Vitt et al. (1989).

C. hispidulum (Brid.) Mitt.

Humus and rotten wood; Fallon, Flathead, GNP, and Phillips; Status unknown; Reported rare in the East (Flowers 1973), but known from nearly all Canadian provinces (Ireland et al. 1987).

C. polygamum (B.S.G.) C. Jens.

Wet soil and humus; GNP; Status unknown; Probably a boreal, temperate species (Crum and Anderson 1981).

C. stellatum (Hedw.) C. Jens.

Circumboreal, rich calcareous fens; Flathead, Glacier, GNP, Lake, Lincoln, Ravalli, and Teton; Common in rich calcareous fens.

C. stellatum var. *protensum* (Brid.) Bryhn ex Grout

Peat banks of streams at high elevations; GNP; Infrequent; Lawton (1971) expressed doubts that this variety is distinct in the Northwest.

Catascoptium nigritum (Hedw.) Brid.

Circumboreal, restricted to rich calcareous fens; Flathead and Ravalli; Rare; Collection of D.H. Vitt (ALTA) in Ravalli County appears to be the most southerly station in the West.

Ceratodon purpureus (Hedw.) Brid.

Soil, often disturbed sites; All counties; Cosmopolitan; Common.

Cinclidium stygium Sw.

Circumboreal, restricted to rich calcareous seeps and fens; Teton; Rare; Known from 2 stations in the western United States, Pine Butte Swamp in Montana, and the Cathedral Cliff fen complex in Park County, Wyoming.

Claopodium bolanderi Best

Pacific maritime, rock, and soil; Flathead, GNP, Lake, Lincoln, and Missoula; Status unknown; Restricted to western Montana.

**C. crispifolium* (Hook.) Ren. & Card.

Wet soil; Lake; Status unknown; Known from S. Flowers' collection (#10,269) and R.S. Williams' collection (#203) deposited at COLO.

Climacium dendroides (Hedw.) Web. & Mohr

Circumboreal, wet soil, and rotten wood, often at edges of fens; Beaverhead, Broadwater, Cascade, Flathead, Gallatin, GNP, Granite, and Lewis and Clark; Common.

Conardia compacta (C. Mull.) Robins.

Wet rock and wood, often in calcareous fens; Chouteau, Flathead, Lake, and Teton; Status unknown.

Conostomum tetragonum (Hedw.) Lindb.

Arctic-alpine, moist depressions and soil over acidic rock; GNP; Rare; Known from 4 stations in GNP.

Coscinodon calypratus (Hook.) C. Jens.

Western endemic on dry rock; Beaverhead, Carter, Flathead, GNP, Lake, Lewis and Clark, Lincoln, Missoula; and Powder River; Common.

Cratoneuron commutatum var. *falcatum* (Brid.) Moenk.

Circumboreal, seeps, springs, and fens; Beaverhead, Fergus, Flathead, Gallatin, GNP, Lake, Madison, and Park; Common.

C. filicinum (Hedw.) Spruce

Circumboreal, wet soil, and rock; Beaverhead, Cascade, Fergus, Flathead, Gallatin, GNP, Granite, Hill, Lake, Lewis and Clark, and Madison; Common.

Crumia latifolia (Kindb. ex Mac.) Schof.

Wet rock and soil; Cascade; Rare; Known from R.S. Williams' collection (1902). Flowers (1973) reported this moss rare, but sometimes locally abundant.

Cynodontium strumiferum (Hedw.) Lindb.

Soil over rock; Cascade, Flathead, and GNP; Status unknown.

C. tenellum (B.S.G.) Limpr.

Rocks and crevices; Cascade; Status unknown; Known from Williams' collection (1902).

Dendrolasia abietina (Hook.) Britt.

Pacific maritime, tree trunks; Flathead; Vitt et al. (1988) considered it "one of the spectacular mosses of the West Coast." Known from Williams' (1902) collection.

Desmatodon cernuus (Hub.) B.S.G.

Calcareous soil; Cascade; Status unknown; Known from Williams' collection (1902).

D. heimii (Hedw.) Mitt.

Saline or alkaline soil; Cascade; Status unknown; Known from 2 stations (Williams 1902).

D. latifolius (Hedw.) Brid.

Soil; Cascade, Flathead, GNP, Hill, Powder River, and Stillwater; Status unknown.

D. obtusifolius (Schwaegr.) Schimp.

Calcareous, dry rock outcrops; Cascade and Fergus; Status unknown; Rather rare (Vitt et al. 1988).

Dichelyma uncinatum Mitt.

Pacific maritime, tree trunks, and branches; GNP and Sanders; Status unknown; Reaches Montana at the eastern edge of its range.

Dichodontium olympicum Ren. & Card.

Endemic to Pacific Northwest on wet soil or soil over rock; GNP; Rare; Known from 2 collections.

D. pellucidum (Hedw.) Schimp.

Wet soil and rock; Flathead, GNP, Lake, Lincoln, and Sanders;
Relatively common, at least near the Pacific Coast (Vitt et al.
1988).

Dicranella crispa (Hedw.) Schimp.

Moist, sandy soil; GNP; Considered rare in GNP (Hermann 1969).

D. grevilleana (Brid.) Schimp.

Damp soil; Flathead and GNP; Considered rare in GNP (Hermann (1969).

D. heteromalla (Hedw.) Schimp.

Damp soil; Flathead and GNP; Infrequent; Common on the West Coast
(Vitt et al. 1988).

D. palustris (Dicks.) Crundw. ex Warb.

Wet rock and soil at high elevations; GNP; Unknown status.

D. schreberiana (Hedw.) Schimp.

Damp soil; Flathead and GNP; Unknown status.

D. subulata (Hedw.) Schimp.

Damp soil; Flathead and GNP; Unknown status.

D. varia (Hedw.) Schimp.

Damp soil; Cascade, Flathead, and GNP; Unknown status.

Dicranoweisia cirrata (Hedw.) Lindb. ex Milde

Pacific maritime, trees, fence posts, and logs, rarely rock; Flathead
and Park; Common species on the Pacific Coast. Hermann's collection
at MONTU from Cooke Pass in Park County, appears to be the
easternmost station in the United States for this species.

D. crispula (Hedw.) Lindb. ex Milde

Acidic rock in coniferous forest; Cascade, Flathead, Gallatin, GNP,
Lake, Lewis and Clark, Madison, Missoula, and Ravalli; Common.

D. crispula var. *contermina* (Ren. & Card. ex Holz.) Grout

Acidic rock; Flathead; GNP, and Ravalli; Unknown status.

Dicranum acutifolium (Lindb. & H. Arnell) C. Jens. ex Weirm.

Arctic-subalpine, rock; Ravalli; Rare; Known from B. McCune's
collection at St. Mary's Peak in the Bitterroot Range (Elliott and
Moore 1989).

**D. angustum*. Lindb.

Rotten wood and humus; GNP; Unknown status; Collection of
W.B. Schofield deposited at MONTU.

D. bonjeanii DeNot ex Lisa.

Soil, humus, and rotten wood; GNP, Lake, and Ravalli; Lawton (1971) is doubtful whether this species is present in western North America. Similar to *D. scoparium*.

D. elongatum Schleich ex Schwaegr.

Soil, humus, and rotten wood; GNP and Lake; Unknown status.

D. flagellare Hedw.

Rotten wood and tree bases; Cascade, Flathead, GNP, and Lincoln; Unknown status.

**D. fragilifolium* Lindb.

Rotten wood and tree bases; GNP and Lake; Rare (Crum and Anderson 1981); 2 Hermann collections are deposited at MONTU; however, Hermann (1969) did not include this species on his list of GNP mosses.

D. fuscescens Sm.

Logs and stumps; Cascade, Flathead, GNP, Lake, Lincoln, Ravalli, and Sanders; Common; Difficult to identify with certainty (Vitt et al. 1988).

D. fuscescens var. *congestum* (Brid.) Husn.

Rock; Flathead; Unknown status; Reported by Williams (1902) from Columbia Falls.

D. howellii Ren. & Card.

Pacific maritime, soil, humus, and rotten wood; Flathead and GNP; Unknown status.

D. muehlenbeckii B.S.G.

Soil and humus; Custer, GNP, Madison, and Missoula; Rare in western North America (Lawton 1981); May be more common in Canada.

D. pallidisetum (Bail. ex Holz.) Ire.

Humus, soil, and rotten wood; GNP; Unknown status.

D. polysetum Sw.

Humus and soil over rock; Carter, Flathead, GNP, and Lake; Common; Abundant and typical of upland boreal and montane forests (Vitt et al. 1988).

D. scoparium Hedw.

Soil, humus, and rotten wood; Cascade, Custer, Fergus, Flathead, Gallatin, GNP, Lake, Lewis and Clark, Lincoln, Madison, and Missoula; Widespread; Most common in spruce-fir subalpine habitats.

D. spadiceum Zett.

Damp rock and soil in alpine; Lake; Rare (Lawton 1971, Flowers 1973); Reported by Eversman and Sharp (1980) as a new state record from A.J. Sharp collection.

D. tauricum Sapeh.

Rotten logs; Gallatin, Golden Valley, GNP, Granite, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Powder River, and Sanders; Common.

D. undulatum Brid.

Circumboreal, organic soil in bogs, fens, and tundra; Cascade, Flathead, and GNP; Rare (Hermann 1969).

Didymodon acutus (Brid.) Saito

Soil, often calcareous; Carter, Fallon, Lewis and Clark, and Roosevelt; Uncommon (Flowers 1973, Crum and Anderson 1981).

D. fallax (Hedw.) Zand.

Damp soil, usually calcareous; Flathead, Lake, and Powder River; Common in eastern states, becoming infrequent or rare in Montana, Idaho, and Utah (Flowers 1973); Pioneer on wet soil.

D. fallax var. *reflexa* (Brid.) Zand.

Calcareous rock or soil; Flathead; Rare; Known from 1 collection on silt along the Flathead River (Williams 1902).

D. insulanus (DeNot.) M. Hill.

Soil and rock; Flathead, GNP, and Lake; Unknown status.

D. rigidulus var. *icmadophila* (Schimp. ex C. Muell.) Zand.

Rock; GNP; Unknown status.

D. tophaceus (Brid.) Lisa.

Wet soil and rock; Carbon, Cascade, and Lewis and Clark; Unknown status.

D. vinealis (Brid.)

Soil and rock; Cascade, Flathead, GNP, and Lincoln; Unknown status.

D. vinealis var. *brachyphyllus* (Sull. in Whipple & Ives) Zand.

Damp soil; GNP; Rare; Known from 1 station in Montana.

Distichium capillaceum (Hedw.) B.S.G.

Soil and soil over rock; Cascade, Fergus, Flathead, Gallatin, GNP, Golden Valley, Granite, Lake, Lewis and Clark, Madison, and Sanders; Common.

D. inclinatum (Hedw.) B.S.G.

Soil and soil over rock; Flathead, GNP, and Ravalli; Unknown status.

Ditrichum ambiguum Best

Damp soil; Flathead; Rare; Reported from Bad Rock Canyon and Essex (Williams 1902).

D. crispissimum (C. Mull.) Par.

Calcareous rock; GNP and Madison; Unknown status.

D. flexicaule (Schwaegr.) Hampe.

Calcareous rock and soil; Cascade, Fergus, Flathead, GNP, and Lake; Common; Most common moss on calcareous rock outcrops in western Canada (Vitt *et al.* 1988).

**D. heteromallum* (Hedw.) Britt.

Pacific maritime, damp soil, at high elevations; Flathead and Park; Unknown status; Known from alpine tundra near Cooke City (Elliott, MONTU #1865) and soil (Flowers, COLO #10,218).

D. pusillum (Hedw.) Hampe

Soil; Lincoln; Rare in the Pacific Northwest (Lawton 1971); Known from J. Pierce's collection (MONTU #1528).

Drepanocladus aduncus (Hedw.) Warnst.

Wet soil, sometimes semi-aquatic; Beaverhead, Carter, Cascade, Gallatin, Glacier, GNP, Granite, Lake, Madison, Missoula, Park, Powell, Richland, Sanders, and Stillwater; Common.

D. capillifolius (Warnst.) Warnst.

Wet soil, sometimes semi-aquatic; Lake, Carbon, and Flathead; Probably common.

D. exannulatus (B.S.G.) Warnst.

Circumboreal, submerged, or emergent from high elevation wetlands; GNP and Lincoln; Rare.

D. fluitans (Hedw.) Warnst.

Submerged or emergent in wetlands; Gallatin, GNP, Lincoln, and Park; Unknown status.

D. revolvens (Sw.) Warnst.

Arctic-alpine, GNP and Lake; Rare; Known from a W.B. Schofield collection in GNP (MONTU) and reported for GNP by Lesica and McCune (1989). Collected by J. Elliott in the Swan Valley in a rich calcareous fen.

D. sendtneri (Schimp. *ex* H. Mull) Warnst.

Wet soil in rich calcareous fens; Granite and Lincoln; Known from Nimrod Warm Springs (Elliott and Moore 1988) and Dudley Slough near Trego (P. Lesica collection).

D. uncinatus (Hedw.) Warnst.

Rock and wood at mesic sites; Beaverhead, Cascade, Fergus, Flathead, Gallatin, GNP, Granite, Hill, Lake, Lewis and Clark, Lincoln, Missoula, Park, Ravalli, Sanders, and Valley; Common.

Dryptodon patens (Hedw.) Brid.

Pacific maritime, rock; Carbon, Flathead, GNP, Lake, and Lincoln; Common. The Carbon County collection is the easternmost station in western North America (Vitt and Belland 1991).

Encalypta affinis Hedw. f.

Soil over rock; Flathead, GNP, and Lincoln; Frequent in GNP (Hermann 1969).

E. ciliata Hedw.

Acidic or neutral soil over rock; Cascade, Flathead, and Lake; Infrequent, probably more common toward the Pacific Coast (Vitt *et al.* 1988).

E. procera Bruch.

Soil over rock; Chouteau, Fergus, Flathead, and GNP; Unknown status.

E. rhaftocarpa Schwaegr.

Soil over rock; Fergus, GNP, Granite, Judith Basin, Lake, Lincoln, Missoula, and Park; Common.

E. vulgaris Hedw.

Soil over rock; Carter, GNP, Golden Valley, Hill, Lake, Lewis and Clark, Madison, and Richland; Common.

Entosthodon rubiginosus (Williams) Grout.

Soil, sagebrush, and dry prairie; Cascade; Known from banks of Missouri River near Great Falls (Lawton 1971); Rare North American endemic (McIntosh 1989).

Eucladium verticillatum (Brid.) B.S.G.

Wet calcareous deposits; Beaverhead, Granite, and Powell; Rare. Known from Montana only at warm springs (Elliott and Moore 1989).

Eurhynchium pulchellum (Hedw.) Jenn

Tree bases and logs; Carter, Cascade, Custer, Flathead, Gallatin, GNP, Hill, Lake, Lewis and Clark, Missoula, Park, Powder River, and Valley; Common.

**E. pulchellum* var. *barnesii* (Ren. & Card.) Crum, Steere, and Anders.

Pacific maritime, rock; Sanders; Rare. One species collected from near Cascade Creek by P. Lesica and G.L. Moore is deposited at MONTU.

**E. ripariooides* (Hedw.) Rich.

Pacific maritime, wet rock; Lake and Sanders; Rare. Two W.B. Schofield collections are deposited at MONTU.

Fabronia pusilla Raddi

Pacific maritime, moist rock; Madison; Rare. Known from one station in the Tobacco Root Mountains near Pony (Elliott and Moore 1989).

Fissidens adianthoides Hedw.

Moist soil, rock, and logs; Flathead, GNP, and Lake; Unknown status.

F. bryoides Hedw.

Shaded, moist soil and rocks; Carter, Cascade, Fallon, Flathead, GNP, and Lake; Common.

F. fontanus (B.-Pyl.) Stend.

Submerged in springs, attached to wood or rock; Cascade, Granite; Rare. Known only from Giant Springs at Great Falls and Bearmouth Warm Springs east of Missoula.

F. grandifrons Brid.

On wet limestone, often submerged; Cascade, Flathead, GNP, Lake, Lewis and Clark, and Missoula; Common; Large, conspicuous aquatic moss.

F. osmundoides Hedw.

Moist soil, rock, and wood; GNP; Unknown status; Frequent on peaty soil in GNP.

Fontinalis antipyretica Hedw.

Submerged in flowing streams; Cascade, GNP, Lincoln, and Missoula; Common.

**F. antipyretica* var. *gigantea* (Sull.) Sull.

Flowing streams; Ravalli; Unknown status. Known from one collection by B. McCune from Big Creek deposited at MONTU.

**F. antipyretica* var. *oregonensis* Ren. & Card.

Flowing streams; Lake and Sanders; Unknown status. Lake and Sanders counties specimens collected by B. McCune and F.J. Hermann, respectively, are deposited at MONTU.

F. howellii Ren. and Card.

Flowing streams; Gallatin and GNP; Unknown status. Lawton (1971) considered this species indistinguishable from *F. antipyretica*.

F. hypnoides C.J. Hartm.

Flowing streams; GNP, Granite, Hill, Lake, and Lincoln; Common.

F. neomexicana Sull. & Lesq.

Endemic to the Pacific Northwest; Beaverhead, Gallatin, GNP, Lincoln, Missoula, and Ravalli; Most common *Fontinalis* in western Montana.

**F. patula* Card.

Flowing streams; GNP; Rare. Known from L.H. Harvey's collection, deposited at MONTU, determined by F.J. Hermann from Camus Creek.

Funaria americana Lindb. ex Sull.

Moist soil and humus; Cascade; Rare (Lawton 1971). The small size of this plant may contribute to its seeming rarity (Crum and Anderson 1981).

F. hygrometrica Hedw.

Cosmopolitan, disturbed soil; Carter, Cascade, Flathead, GNP, Lake, Lewis and Clark, and Sanders; Common. Frequent following fire, often with *Ceratodon purpureus*.

Grimmia affinis Hoppe & Hornsch. ex Hornsch.

Dry rock; Carter; Unknown status. Churchill (1983) reported the first Montana collection.

G. anodon B.S.G.

Dry, exposed, calcareous rock; Carter, Cascade, Custer, Flathead, GNP, Granite, Lake, Lewis and Clark, and Ravalli; Common. Rare in the eastern United States and west of the Cascade Range.

G. brittoniae Williams

Rock; Flathead and GNP; Endemic to northwestern Montana; Rare. Known only from Bad Rock Canyon near Columbia Falls. Since its discovery in 1896 (Williams 1902), smelter emissions have subjected Bad Rock Canyon to chronic air pollution. This species should be searched for to verify that it remains extant.

G. elatior Bruch ex Bals. & DeNot.

Rock; Cascade, Flathead, and GNP; Unknown status.

G. incurva Schwaegr.

Arctic-alpine rock; Ravalli; Rare (Crum and Anderson 1981). Known from St. Mary's Peak in the Bitterroot Range. First reported by Elliott and Moore (1988).

**Grimmia laevigata* (Brid.) Brid.

Rock; Sanders; Unknown status. Collected from quartzite slabs along the Flathead River by P. Lesica and G.L. Moore (MONTU). Flowers (1973) reported that this moss is probably often overlooked because it does not fruit freely and sterile specimens are difficult to identify.

Grimmia mollis B.S.G.

Arctic-alpine, rock in or near mountain streams; GNP; Rare (Hermann 1969). Known from 3 locations in GNP.

G. montana B.S.G.

Rock; Carbon, Flathead, GNP, Granite, Lake, Lewis and Clark, Lincoln, Madison, Mineral, Missoula, and Sanders; Common.

G. ovalis (Hedw.) Lindb.

Rock; Cascade, Flathead, Gallatin, GNP, Madison, and Missoula; Common.

G. plagiopodia Hedw.

Sandstone or limestone; Carter, Cascade, Fallon, Garfield, Roosevelt, Rosebud, and Valley; Rare in western Montana, apparently common in eastern Montana. May be limited in distribution by suitable habitat (e.g., sandstone and limestone).

G. pulvinata (Hedw.) Sm.

Rock and concrete; Cascade and Lake; Unknown status.

G. tenerrima Ren. & Card.

Dry cliffs and boulders in montane habitat; GNP, Lake, and Ravalli; Unknown status. Lawton (1971) did not include this species in the Moss Flora of the Pacific Northwest.

G. torquata Hornsch. ex Grev.

Rock and soil over rock at high elevations; Cascade, Flathead, and Lake; Unknown status.

G. trichophylla Grev.

Rock; Gallatin, Lake, Lincoln, and Sanders; Unknown status.

Gymnostomum aeruginosum Sm.

Moist rock, usually limestone; Carter, Cascade, Glacier, GNP, Golden Valley, Missoula, and Sanders; Uncommon.

G. recurvirostrum Hedw.

Moist rock, often limestone; Beaverhead, Cascade, GNP, Hill, and Lewis and Clark; Unknown status.

Hedwigia ciliata (Hedw.) P. Beauv.

Acidic rock; Flathead, GNP, Lake, Missoula, and Swan Valley; Common.

Helodium blandowii (Web. & Mohr) Warnst.

Wet soil and humus in bogs and fens; Beaverhead, Carbon, Cascade, Flathead, Glacier, and Lake; Infrequent.

Herzogiella seligeri (Brid.) Iwats.

Pacific maritime, rotten logs, and tree bases; Flathead, GNP, Lake, and Swan Valley; Uncommon.

H. turfacea (Lindb.) Iwats.

Soil, humus, and rotten wood; Flathead and GNP; Rare (Lawton 1971). Ranges of *H. seligeri* and *H. turfacea* overlap in western Montana.

Heterocladium dimorphum (Brid.) B.S.G.

Rock and soil over rock; Flathead, GNP, Lake, Missoula, and Swan Valley; Unknown status.

H. procurrens (Mitt.) Rau & Herv.

Rock and soil over rock at high elevations; Flathead, GNP, Lake, and Swan Valley; Unknown status.

Homalothecium aeneum (Mitt.) Lawt.

Pacific maritime, rock, and soil over rock; Cascade, Fergus, Flathead, GNP, and Ravalli; Unknown status.

H. fulgescens (Mitt. ex C. Mull.) Lawt.

Pacific maritime, logs, and tree bases; Flathead, Lake, and Sanders; Uncommon.

H. nevadense (Lesq.) Ren. & Card.

Dry rock, western North America; Beaverhead, Flathead, GNP, Golden Valley, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Powder River, Ravalli, Sanders, and Valley; Common.

Hygrohypnum bestii (Ren. & Bryhn ex Ren.) Holz. ex Broth.

Attached to stones in streams, northeast inland to South Dakota; Cascade, Flathead, Gallatin, GNP, Lake, and Lewis and Clark; Common.

**H. cochlearifolium* (Vent. ex DeNot) Broth.

Pacific maritime, wet places in mountains; Lincoln; Rare (Lawton 1971). Known from collection of W.B. Schofield (MONTU) from along the Leigh Lake Trail.

**H. durisculum* (De Not.) Jamieson

Wet rock; Lake, Unknown status; Known from S. Flowers' collection deposited at COLO (#10,156) as *H. dilatatum*. Ireland et al. (1987) considered *H. dilatatum* to be *H. durisculum*, whereas Anderson et al. (1990) classified it as *H. molle*.

H. luridum (Hedw.) Jenn.

Streams and wet places; Gallatin, GNP, Lake, Lewis and Clark, and Lincoln; Common.

H. molle (Hedw.) Loeske

Streams and wet places; Cascade, Fergus, and GNP; Unknown status.

H. ochraceum (Turn. ex Wils.) Loeske

Streams and wet places; Cascade, Flathead, GNP, Jefferson, Lake, Ravalli, and Sanders; Unknown status.

H. smithii (Sw. ex Lilj.) Broth.

Rocks in or near streams; GNP; Unknown status.

Hylocomium splendens (Hedw.) B.S.G.

Soil and humus in coniferous boreal and montane forests; Cascade, Flathead, Gallatin, GNP, Granite, Lake, Lewis and Clark, Lincoln, Madison, and Missoula; One of the most common forest mosses.

Hyphnum bambergii Schimp.

Arctic-alpine, wet tundra; GNP; Rare; Reported by Lesica and McCune (1989) from Lunch Creek cirque and Reynolds Mountain.

H. circinale Hook.

Pacific maritime, logs, trees and rock; GNP and Lake; Unknown status.

H. cupressiforme Hedw.

Soil, humus, and rock; Beaverhead, Broadwater, Flathead, GNP, Golden Valley, Granite, Judith Basin, Lake, and Lewis and Clark; Common.

H. lindbergii Mitt.

Wet soil and humus; Flathead, Lake, and Lewis and Clark; Unknown status.

H. pallescens (Hedw.) P. Beauv.

Tree bases, wet soil, sometimes rock; Flathead, Lewis and Clark, and Missoula; Unknown status.

H. pratense W. Koch ex Spruce

Wet soil and rock; Flathead, Gallatin, and GNP; Unknown status.

**H. procerrimum* Mol.

Dry, shaded soil; Flathead; Unknown status; Known from S. Flowers' collection deposited at COLO (#10,130).

**H. recurvatum* (Lindb. & H. Arnell) Nyh.

Dry rock; Lake; Unknown status; Known from S. Flowers' collection deposited at COLO (#10,118).

H. revolutum (Mott.) Lindb.

Soil and rock; Cascade, Fergus, Flathead, Gallatin, Glacier, GNP, Golden Valley, Granite, Judith Basin, Lake, Lewis and Clark, Madison, Park, and Ravalli; Common.

H. subimponens Lesq.

Tree trunks and rotten logs; Flathead, GNP, Lake, and Lewis and Clark; Unknown status.

H. vaucheri Lesq.

Calcareous rock and soil; Flathead, GNP, Golden Valley, Lake, Madison, and Richland; Common.

Isopterygium pulchellum (Hedw.) Jaeg. & Sauerb.

Soil, trees, and rotten wood at high elevations; Cascade, Flathead, Gallatin, GNP, Lake, and Lincoln; Common.

Isothecium myosuroides Brid.

Trees, soil, and rock; Flathead, Lake, and Lincoln; Unknown status.

Jaffueliobryum raui (Aust.) Ther.

Sandstone and calcareous rock; Carter, Fallon, and Roosevelt; Probably common in eastern Montana. Reported by Churchill (1982) as new state record.

J. wrightii (Sull. in Gray) Ther.

Sandstone; Custer, Fallon, Garfield, Rosebud, and Valley; Probably common in eastern Montana. Reported by Churchill (1982) as new state record.

Kiaeria blytii (Schimp.) Broth.

Arctic-alpine, soil, and rock; GNP and Park; Rare.

**K. falcata* (Hedw.) Hag.

Arctic-alpine, moist soil, and tundra; Park; Rare; Collected from alpine area of Henderson Mountain near Cooke City by J.C. Elliott (MONTU #1867).

K. starkei (Web. & Mohr.) Hag.

Arctic-alpine, moist soil, and tundra; GNP and Lake; Rare.

Kindbergia oregana (Sull.) Ochyra

Pacific maritime, rotten wood, and humus; Flathead, Lake, Lincoln, and Sanders; Uncommon.

K. praelonga (Hedw.) Ochyra

Pacific maritime, rotten wood, and humus; Flathead, GNP, Lake, and Sanders; Unknown status.

Leptobryum pyriforme (Hedw.) Wils.

Cosmopolitan, soil and rotten wood; Cascade, Flathead, GNP, Lake, Lewis and Clark, Lincoln, Powell, and Sanders; Common.

Lescuraea atricha (Kindb. ex Mac. & Kindb.) Lawt.

Pacific maritime, rock; Flathead and Glacier; Unknown status; Known from North Fork Cutbank Creek and Columbia Falls (Williams 1902).

L. incurvata (Hedw.) Lawt.

Rock; Flathead, GNP, and Lake; Unknown status.

L. incurvata var. *tenuiretis* (Culm.) Lawt.

Rock; GNP; Unknown status; Known from Hanging Gardens.

L. patens (Lindb.) H. Arnell. & C. Jens.

Rock, usually alpine; Flathead, GNP, Lake, Lincoln, and Ravalli; Common.

L. radicosa (Mitt.) Monk.

Rock, sometimes wood; Flathead, GNP, Lake, and Madison; Unknown status.

L. radicosa var. *compacta* (Best) Lawt.

Rock; GNP; Unknown status.

L. radicosa var. *pallida* (Best) Lawt.

Rock; Cascade and GNP; Unknown status.

L. stenophylla (Ren. & Card. ex Roll) Kindb.
Pacific maritime, trees, and wood; Flathead, GNP, and Lake; Unknown status.

Leskea polycarpa Hedw.
Tree bases and moist soil; Cascade, Flathead, and Gallatin; Unknown status.

Leskeella nervosa (Brid.) Loeske
Tree bark and rock; Beaverhead, Cascade, Flathead, GNP, Hill, and Lake; Unknown status.

Meesia longiseta Hedw.
Wet soil and humus in bogs and fens; GNP; Rare.

M. triquetra (Richt.) Aongstr.
Circumpolar, wet soil, and humus in rich fens; Glacier and Teton;
Rare; Occurs at Flat Iron Fen, west of Browning, and Pine Butte Swamp, west of Choteau.

M. uliginosa Hedw.
Circumboreal, wet soil, and humus in rich fens; Fergus, Flathead, and GNP; Rare.

Metaneckera menziesii (Hook. ex Drumm.) Steere.
Rock; Cascade, Flathead, GNP, Judith Basin, Lincoln, Ravalli, and Sanders; Common.

Mielichhoferia macrocarpa (Hook. ex Drumm.) Bruch & Schimp.
Circumpolar, wet rock, cliffs often near waterfalls; Park; Extremely rare; Known from one station near Silver Gate.

Mnium blytii B.S.G.
Wet soil; Beaverhead, Flathead, GNP, Hill, and Lewis and Clark;
Unknown status.

M. marginatum (With.) Brid. ex P. Beauv.
Rotten logs and moist soil; Cascade, Flathead, GNP, and Sanders;
Unknown status.

M. spinulosum B.S.G.
Rotten wood and moist soil; Fergus, Flathead, GNP, Lake, Lincoln,
Missoula, Ravalli, and Sanders; Common.

M. thomsonii Schimp.
Soil and soil over rock; Flathead, GNP, and Lake; Unknown status.

Myurella julacea (Schwaegr.) B.S.G.
Soil over rock and logs; Flathead and GNP; Unknown status.

M. tenerrima (Brid.) Lindb.

Sandstone; GNP; Rare; Known from one location in GNP.

**Neckera douglasii* Hook.

Pacific maritime, trees, and rocks; Lake; Rare; Known from W.B. Schofield's collection at Yellow Bay (MONTU).

N. pennata Hedw.

Trees and Rocks; Flathead; Rare; Reported by Eversman and Sharp (1980) from A.J. Sharp's collection.

Oligotrichum aligerum Mitt.

Pacific maritime, soil; Lincoln; Rare; Known from one station near Leigh Lake (Elliott and Moore 1988).

O. hercynicum (Hedw.) D.C.

Arctic-alpine, moist soil; GNP; Infrequent; Several stations in GNP.

Oncophorus virens (Hedw.) Brid.

Moist soil and rock; Flathead, GNP, Lake, Ravalli, and Sanders; Common.

O. wahlenbergii Brid.

Moist soil and rotten wood; Cascade, Flathead, and GNP; Unknown status.

Orthothecium chryseum (Schwaegr. ex Schultes) B.S.G.

Wet soil and rock; Flathead and GNP; Unknown status.

Orthotrichum affine Brid.

Trees and rarely rock; Beaverhead, Broadwater, Fergus, Flathead, GNP, Lake, Lewis and Clark, Madison, Missoula, and Sanders; Common.

O. alpestre Hornsch ex B.S.G.

Rock, sometimes trees; Cascade, Flathead, GNP, Lewis and Clark, Madison, Missoula, and Ravalli; Common.

O. anomalum Hedw.

Cascade, Hill, Lake, Lewis and Clark, Madison, Powder River, Ravalli, and Teton; Common in central Montana.

O. cupulatum Brid.

Rock, often calcareous; Flathead and GNP; Unknown status, but more common in dry areas of ponderosa pine forests (Vitt 1973).

O. laevigatum Zett.

Rock; Chouteau, Fergus, Flathead, GNP, Hill, Lincoln, Missoula, and Ravalli; Unknown status.

- O. *laevigatum* f. *macounii* Lawt. & Vitt in Lawt.
Rock; GNP, Lake, Lewis and Clark, Ravalli, and Sanders; Unknown status.
- O. *obtusifolium* Brid.
Trees, usually cottonwood; Carter, Fallon, Flathead, GNP, Golden Valley, Hill, Lake, Lincoln, Missoula, Richland, Sanders, and Teton; Common.
- O. *pellucidum* Lindb.
Boulders and cliff faces; Fergus, Flathead, Golden Valley, Granite, Hill, Judith Basin, Lake, Madison, Missoula, Phillips, and Ravalli; Probably common.
- O. *pumilum* Sw.
Trees, usually cottonwood; Beaverhead, Cascade, Chouteau, Fallon, Flathead, GNP, and Powder River; Probably common.
- *O. *praemorsum* Vent. in Roell
Rock; Ravalli; Rare; One specimen collected by P. Lesica and G.L. Moore near Sleeping Child warm springs is deposited at MONTU.
- O. *rupestre* Scheich. ex Schwaegr.
Noncalcareous rock; Beaverhead, Flathead, GNP, Lake, Lewis and Clark, Lincoln, Missoula, Ravalli, and Sanders; Common.
- O. *speciosum* Nees ex Sturm
Trees and sometimes rock; Cascade, Flathead, GNP, Granite, Lake, Lincoln, and Madison; Common.
- O. *speciosum* var. *elegans* (Schwaegr. ex Hook and Grev.) Warnst.
Wood; GNP, Madison, and Phillips; Status unknown.
- Oxystegus tenuirostris* (Hook. and Tayl.) A.J.E. Sm.
Soil and soil over rock; Flathead; Unknown status; 1 collection from soil on log near Columbia Falls (Williams 1902).
- Paludella squarosa* (Hedw.) Brid.
Arctic-alpine, wet soil in rich fens; Carbon and GNP; Rare; Known from 3 locations in GNP and 1 in Beartooth Mountains near Red Lodge.
- Paraleucobryum enerve* (Thed. ex C.J. Hartm.) Loeske
Arctic-alpine, moist tundra, and rock; GNP and Stillwater; Rare; Known from 2 locations in GNP and 1 in the Beartooth Mountains.
- P. *longifolium* (Hedw.) Loeske
Arctic-alpine, soil, and rock; GNP; Rare; Known from 1 site near Lake MacDonald.

Philonotis fontana (Hedw.) Brid.

Wet soil; Beaverhead, Fergus, Flathead, Gallatin, GNP, Lake, Lewis and Clark, Lincoln, Missoula, Park, and Ravalli; Common.

P. fontana var. *americana* (Ditm.) Flotz ex Crum
Wet soil; GNP; Unknown status.

P. fontana var. *caespitosa* (Jur.) Schimp.
Wet soil; GNP; Unknown status.

P. fontana var. *pumila* Turn. Brid.
Wet soil; GNP; Unknown status.

Physcomitrium hookeri Hampe

Soil; Carter and Cascade; Rare; Reported by Williams (1902) from Horseshoe Falls of the Missouri River. This site has been inundated by a dam and reservoir.

Plagiobryum demissum (Hook.) Lindb.

Wet rock; GNP; Rare; Known from 1 collection (Elliott and Moore 1988).

P. zierii (Hedw.) Lindb.

Wet soil and rock; GNP; Rare; Known from 1 collection (Williams 1902).

Plagiomnium ciliare (C. Mull.) Kop.

Wet soil; Broadwater, Cascade, Flathead, Glacier, and Lake; Common.

P. cuspidatum (Hedw.) Kop.

Wet soil; Flathead, Gallatin, Hill, and Phillips; Unknown status.

P. drummondii (Bruch & Schimp.) Kop.

Wet soil; Flathead and GNP; Unknown status.

P. ellipticum (Brid.) Kop.

Wet soil; Beaverhead, Flathead, Gallatin, Glacier, GNP, Hill, Lake, Lewis and Clark, Madison, Sanders, and Teton; Common.

P. insigne (Mitt.) Kop.

Wet soil; Flathead, GNP, Granite, and Lake; Unknown status.

P. medium (B.S.G.) Kop.

Wet soil; Beaverhead, Flathead, GNP, Lake, Lewis and Clark, Madison, and Sanders; Unknown status.

P. rostratum (Schrad.) Kop.

Wet soil; Beaverhead, GNP, Lake, and Lewis and Clark; Unknown status.

P. venustum (Mitt.) Kop.

Wet soil; Flathead, GNP, Lake, Lewis and Clark, Missoula, and Ravalli; Common.

Plagiopus oederiana (Sw.) Crum & Anders.

Calcareous rock; Flathead, GNP, Lake, and Lincoln; Unknown status.

Plagiothecium denticulatum (Hedw.) B.S.G.

Pacific maritime, humus, and rotten wood; Flathead, GNP, and Lake; Unknown status.

P. laetum B.S.G.

Humus; GNP and Lake; Unknown status.

P. piliferum (Sw. ex C.J. Hartm.) B.S.G.

Pacific maritime, wet rock; Flathead, GNP, and Lake; Unknown status.

Platydictya jungermannioides (Brid.) Crum

Wet soil and rotten wood; Cascade, Flathead, Lake, Ravalli, and Sanders; Uncommon.

**Platygyrium repens* (Brid.) B.S.G.

Rock and wood; GNP and Lake; Rare; Two collections of L.H. Harvey are deposited at MONTU. These identifications should be verified because they are considerable range extensions if correct.

Pleurozium schreberi (Brid.) Mitt.

Circumboreal, humus, and rotten logs; Carter, Cascade, Flathead, GNP, Lake, Lincoln, Madison, and Missoula; Common in conifer forests in west part of state.

Pogonatum urnigerum (Hedw.) P. Beauv.

Circumboreal, soil; Flathead, GNP, and Lake; Uncommon.

Pohlia annotina (Hedw.) Lindb.

Damp soil; GNP; Unknown status; Known from one collection.

P. atropurpurea (Wahlenb.) H. Lindb.

Moist soil; Flathead; Unknown status; One 1896 collection of Williams (1902) from Columbia Falls.

P. cruda (Hedw.) Lindb.

Soil; Cascade, Flathead, GNP, Hill, Judith Basin, Lake, Lewis and Clark, Missoula, Park, Ravalli, and Valley; Common.

P. drummondii (C. Muell.) Andr.

Damp soil; GNP; Rare (Hermann 1969).

P. longicollis (Hedw.) Lindb.

Soil; Cascade and Lincoln; Unknown status.

P. nutans (Hedw.) Lindb.

Soil and rotten wood; Flathead, GNP, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Park, and Ravalli; Common.

P. obtusifolia (Brid.) L. Koch

Arctic-alpine, damp soil; Flathead and GNP; Rare.

P. vexans (Limp.) Lindb.

Wet soil; Cascade; Unknown status; Collected by Williams (1902) from station along Tenderfoot Creek.

P. wahlenbergii (Web. and Mohr.) Andr.

Wet soil; Broadwater, Flathead, Gallatin, GNP, Lake, Lewis and Clark, and Ravalli; Common.

Polytrichum alpinum Hedw.

Soil; Cascade, Flathead, GNP, Lake, and Lincoln; Common.

P. alpinum var. *septentrionale* (Brid.) Lindb.

Soil; GNP; Unknown status.

P. commune Hedw.

Soil; Cascade, GNP, and Judith Basin, Unknown status.

P. formosum Hedw.

Soil in fens and bogs; Beaverhead, GNP, Lake, Missoula, and Park; Uncommon.

P. juniperinum Hedw.

Soil; Broadwater, Carter, Gallatin, GNP, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Park, and Ravalli; Common.

P. longisetum Brid.

Soil; GNP and Lincoln; Unknown status.

P. lyallii (Mitt.) Kindb.

Soil; Flathead and GNP; Rare; Western endemic.

P. piliferum Hedw.

Sandy soil; Cascade, Flathead, GNP, Lake, Missoula, Ravalli, and Sanders; Common.

P. sexangulare Brid.

Soil; GNP; Unknown status.

P. strictum Brid.

Wet soil in fens and bogs; Beaverhead, Cascade, Flathead, and Glacier; Uncommon.

**Porotrichum bigelovii* (Sull.) Kindb.

Pacific maritime, moist rock; Ravalli; Rare; Known from B. McCune's collection (MONTU) from Bear Creek in the Bitterroot Mountains.

Pseudoleskeella tectorum (Funck ex Brid.) Kindb. ex Broth.

Rock and tree bases; Carter, Fallon, GNP, Golden Valley, Lake, Lewis and Clark, Madison, Missoula, Phillips, and Rosebud; Common.

Pterigynandrum filiforme Hedw.

Rock and wood; Beaverhead, Cascade, Flathead, Gallatin, GNP, Granite, Lake, Lewis and Clark, Lincoln, Missoula, and Ravalli; Common.

Pterygoneurum ovatum (Hedw.) Dix.

Soil; Chouteau, Fallon, Flathead, Lake, and Lewis and Clark; Uncommon.

Ptilium crista-castrensis (Hedw.) DeNot.

Humus; Cascade, Flathead, Gallatin, GNP, Lake, Lewis and Clark, Madison, and Ravalli; Common in conifer forests.

Ptychomitrium gardnerni Lesq.

Pacific maritime, rock; Flathead and Lake; Unknown status. Known from Williams (1902) and 2 unreported specimens of S. Flowers (COLO #10,187 and #10,075).

Pylaisiella polyantha (Hedw.) Grout

Trees and logs; Broadwater, Cascade, Fallon, Flathead, GNP, Golden Valley, Granite, Hill, Judith Basin, Powder River, and Richland; Common.

Racomitrium aciculare (Hedw.) Brid.

Stone in or near streams; GNP; Rare.

R. aquaticum (Brid. ex Schrad.) Brid.

Pacific maritime, wet soil, and rock; GNP; Rare; Known from 1 W.B. Schofield collection (MONTU).

R. canescens (Hedw.) Brid.

Rock and soil; Cascade, Flathead, GNP, and Lake; Common.

**R. ericoides* (Web. ex Brid.) Brid.

Rock and soil; Missoula and Swan Valley; Rare; Known from 1 F.J. Hermann collection near Lolo (MONTU) and reported by B. McCune (1979) for the Swan Valley.

R. fasciculare (Hedw.) Brid.

Rock in mountains; GNP; Unknown status.

R. heterostichum (Hedw.) Brid.

Rock and rotten wood; Flathead, GNP, Lake, Missoula, Ravalli, and Sanders; Common.

**R. heterostichum* var. *microcarpon* (Hedw.) Boul.

Dry rock; Lake; Unknown status; Known from S. Flowers' collection deposited at COLO (#10,192).

R. lanuginosum (Hedw.) Brid.

Rock; GNP, Lake, Lincoln, and Swan Valley; Common.

**R. occidentale* (Ren. & Card.) Ren. & Card.

Pacific maritime, rock; Flathead; One F.J. Hermann collection (MONTU) from near Hungry Horse.

R. sudeticum (Funck) B.S.G.

Rock; Cascade and GNP; Unknown status.

R. sudeticum f. *maccounii* (Kindb.) Lawt.

Pacific maritime, rock; GNP and Lake; Unknown status.

**R. varium* (Mitt.) L & J.

Dry rock; Lake; Unknown status; Known from S. Flowers collection near Mission Creek deposited at COLO (#10,121).

Rhizomnium magnifolium (Horik.) Kop.

Wet soil; GNP; Judith Basin, Ravalli, and Stillwater; Unknown status; Probably not rare.

R. nudum (Britt. & Williams) Kop.

Pacific maritime, wet soil; Flathead and GNP; Unknown status; Hermann (1969) reported it frequent in GNP.

R. pseudopunctatum (Bruch & Schimp.) Kop.

Wet soil, Fergus, Flathead, and GNP; Uncommon.

R. punctatum (Hedw.) Kop.

Wet soil; Flathead, GNP, Lake, and Missoula; Uncommon.

Rhyncostegium serrulatum (Hedw.) Jaeq. & Sauerb.

Rotten wood and soil; Swan Valley; Rare (Lawton 1971); Reported by B. McCune (1979) from Swan Valley, but no specimen deposited at MONTU.

Rhytidadelphus loreus (Hedw.) Warnst.

Humus, logs, and stumps; Flathead, Gallatin, GNP, and Sanders; Unknown status.

R. squarrosus (Hedw.) Warnst.

Wet soil and wood; Flathead, GNP, Lincoln, and Missoula; Unknown status.

R. triquetrus (Hedw.) Warnst.

Humus and logs; Cascade, Fergus, Flathead, GNP, Lake, Lincoln, Madison, Missoula, and Sanders; Common.

Rhytidopsis robusta (Hook.) Broth.

Pacific maritime, soil, and humus; Flathead, GNP, Lake, Lincoln, Mineral, and Sanders; Common; Endemic to Pacific Northwest.

Rhytidium rugosum (Hedw.) Kindb.

Soil and soil over rock; GNP, Lake, and Missoula; Unknown status.

Roellia roellii (Borth. ex Roll.) Andr. in Crum

Pacific maritime, soil, and humus; Cascade, Flathead, Gallatin, GNP, Lake, Lincoln, and Missoula; Common; May be associated with old growth forests.

Schistidium agassizii Sull. and Lesq. ex Sull.

Wet rock; GNP and Swan Valley; Unknown status.

S. apocarpum (Hedw.) B. & S. in B.S.G.

Rock; Carter, Cascade, Flathead, GNP, Granite, Hill, Lewis and Clark, Lake, Lewis and Clark, Lincoln, Madison, Missoula, and Ravalli; Common.

S. rivulare (Brid.) Podp.

Rock; Cascade, Flathead, GNP, Golden Valley, Lincoln, Madison, and Ravalli; Common.

S. tenerum (Zett.) Nyh.

Rock; Cascade and Missoula; Unknown status.

Schistostega pennata (Hedw.) Web. & Mohr.

Soil and rock in shallow caves and crevices; GNP; Rare; The protonemata of this moss reflect light and appear to "glow" in dark.

Scleropodium obtusifolium (Jaeg. & Sauvrb.) Kindb. ex Mac. & Kindb.

Pacific maritime, wet rock often submerged; Cascade, Flathead, GNP, Lake, Lincoln, and Sanders; Common.

S. touretei (Brid.) L. Koch.

Pacific maritime, soil, and rock; Cascade, Flathead, and GNP; Unknown status.

Scorpidium scorpioides (Hedw.) Limpr.

Circumpolar, wet soil of rich fens; Flathead, Glacier, Lincoln, and Teton; Rare; Restricted to calcareous seeps and fens.

S. turgescens (T. Jens.) Loeske

Circumpolar, wet soil in rich fens; GNP and Teton; Rare; Restricted to calcareous seeps and fens.

Scouleria aquatica Hook.

Pacific maritime, wet rock, often submerged; Cascade, Flathead, GNP, Lewis and Clark, Lincoln, and Mineral; Common.

Seligeria campylopoda Kindb. ex Mac. & Kindb.

Damp rock, often limestone; Cascade, Fergus, Flathead, GNP, and Ravalli; Unknown status.

S. donniana (Sm.) C. Mull.

Calcareous rock; Flathead; Rare; Reported by Vitt (1990) for Montana collection from southwest of Hungry Horse Dam.

Sphagnum angustifolium (C. Jens. ex Russ.) C. Jens.

Wet peat in bogs and fens; Beaverhead, Flathead, GNP, and Missoula; Rare.

S. capillifolium (Ehrh.) Hedw.

Wet soil in bogs and fens; Beaverhead, Flathead, GNP, Missoula, and Ravalli; Uncommon.

S. centrale C. Jens. ex H. Arnell & C. Jens.

Wet soil and peat in bogs and fens; GNP and Missoula; Rare; Known from Fish Lake and Akaiyan Lake in GNP and from Lindbergh Lake in the Swan Valley.

S. compactum DC. ex Lam. & DC.

Wet soil and peat; Granite; Rare; Known in Montana from Mud Lake near Skalkaho Pass. Rare in Alberta, occurring in alpine habitats of Jasper National Park and disjunct in the Swan Hills of north-central Alberta (Vitt and Andrus 1977). Christy et al. (1982) reported it from Oregon and R.E. Andrus (pers. comm., 1978) confirmed that it occurs in western Washington.

S. contortum K.F. Schultz

Wet soil and peat; GNP; Rare; Known for Montana only at Fish Lake in GNP. Vitt and Andrus (1977) reported 1 collection from extreme northern Alberta.

S. fallax (Klinggr.) Klinggr.

Wet soil and peat; Flathead; Rare; Reported by Eversman and Sharp (1980) as a new state record.

S. fimbriatum Wils. in Wils. & Hook. f.

Wet soil and peat; Beaverhead, GNP, and Lewis and Clark; Rare; Known from area with acid mine drainage east of Lincoln and Skull Creek Meadows in Beaverhead National Park.

S. fuscum (Schimp.) Klinggr.

Wet soil and peat; GNP and Missoula; Rare; Known from Shoofly Meadows in the Rattlesnake Mountains.

S. girgensohnii Russ.

Wet soil in conifer forests; GNP and Lincoln; Rare; Known from J.C. Elliott's collection (MONTU #1518) from old growth cedar-hemlock forest along Libby Creek. Reported from 2 stations in GNP (Standley 1920).

S. magellanicum Brid.

Wet soil and peat; GNP and Missoula; Rare; Known from bog on Adair Ridge, GNP, and Meadow Lake west of Seeley Lake.

S. mendocinum Sull. & Lesq. ex Sull.

Pacific maritime, wet soil, and peat; Missoula; Rare; Known from Mary's Frog Pond and along Granite Creek north of Lolo Pass. Missoula County is the easternmost station in the United States for this species.

S. platyphyllum (Lindb. ex Braithw.) Sull. ex Warnst.

Wet soil and peat; Granite (?) and Meagher; Rare; Known from Needles-Mount Edith (G.L. Moore collection). Reported by Andrus and Layser (1976) from "Upper Clark Fork R."

S. riparium Aongstr.

Wet soil and peat; Missoula; Rare; Known only from Shoofly Meadows. Vitt and Andrus (1977) believe this species to be moderately frequent in northern Alberta.

S. russowii Warnst.

Wet soil and peat; Beaverhead, Carbon, Fergus, GNP, Granite, Jefferson, Lewis and Clark, Lincoln, Meagher, Park, and Ravalli; Common and widespread peat moss in Montana.

S. squarrosum Crome

Wet soil; GNP, Lincoln, Missoula, and Ravalli; Common; Appears to be restricted to western Montana.

S. subnitens Russ. & Warnst. ex Warnst.

Wet soil and peat; GNP; Rare; Reported by Hermann (1969) from 2 GNP sites.

S. subsecundum Nees ex Sturm

Wet soil and peat; GNP, Lincoln, Meagher, and Missoula; Common.

S. teres (Schimp.) Aongstr. ex C. Hartm.

Wet soil; GNP, Granite, Lincoln, Missoula, Park, and Ravalli; Common.

S. warnstorffii Russ.

Wet soil and peat; Beaverhead, Carbon, Flathead, Glacier, GNP, Lincoln, Meagher, Missoula, and Ravalli; Common.

Stegonia latifolia (Schwaegr. ex Schultes) Vent. ex Broth.

Arctic-alpine, soil, and rock; GNP; Rare; Reported by Hermann (1969) from 1 location in GNP.

Tayloria acuminata Hornsch.

Damp humus; Cascade; Rare; Known from upper Sand Coulee and the Belt Mountains (Williams 1902). Extremely rare in Utah (Flowers 1973).

T. lingulata (Dicks.) Lindb.

Circumpolar, damp soil, and humus; GNP; Rare; Reported by Hermann (1969) from 1 location.

T. serrata (Hedw.) B.S.G.

Circumpolar, humus, and dung; GNP and Madison; Rare; Madison County collection by F.J. Hermann, deposited at MONTU, appears to be the most southerly station in North America.

Tetraphis pellucida Hedw.

Rotten wood and peaty soil; Cascade, Fergus, Flathead, Gallatin, GNP, Granite, Lake, Lewis and Clark, and Ravalli; Common.

Tetrapodon angustatus (Hedw.) B.S.G.

Circumpolar, humus, and dung; Lewis and Clark; Rare; Known from 1 collection near Rimini (Elliott and Moore 1989). This is the southernmost station in the northwestern United States (Marino 1988).

Thamnobryum neckeroides (Hook.) Lawt.

Pacific maritime, soil, rock, and tree bases; Flathead; Rare; One station near Essex reported by Williams (1902).

Thuidium abietinum (Hedw.) B.S.G.

Soil and humus; Carter, Cascade, Custer, Fergus, Flathead, Gallatin, GNP, Golden Valley, Hill, Judith Basin, Lewis and Clark, Richland, and Valley; Common.

T. recognitum (Hedw.) Lindb.

Soil and humus; Cascade, Fergus, Flathead, Gallatin, GNP, Flathead, and Lake; Common.

Timmia austriaca Hedw.

Soil and humus; Cascade, Flathead, Gallatin, GNP, Granite, Hill, Lake, Lewis and Clark, Missoula, and Sanders; Common.

T. megapolitana Hedw.

Soil and rock; Cascade, Flathead, Gallatin, Granite, Lewis and Clark, and Madison; Unknown status.

T. megapolitana ssp. *bavarica* (Hessl.) Brass.

Soil and rock; Flathead, GNP, Lake, and Missoula; Probably common.

T. norvegica Zett.

Rock, GNP; Rare (Hermann 1969); 2 collections from GNP.

Tomentypnum nitens (Hedw.) Loeske.

Damp soil and humus; Beaverhead, Flathead, Glacier, GNP, Lewis and Clark, and Teton; Common.

Tortella fragilis (Drumm.) Limpr.

Soil and rock; Cascade, Flathead, GNP, and Lewis and Clark; Common.

T. inclinata (Hedw. f.) Limpr.

Wet soil; GNP; Unknown status.

T. tortuosa (Hedw.) Limpr.

Soil and stone, usually calcareous; Cascade, Fergus, Flathead, Gallatin, GNP, Golden Valley, Lake, Lewis and Clark, Lincoln, and Ravalli; Common.

Tortula mucronifolia Schwaegr.

Rock; GNP, Hill, Lake, Lewis and Clark, Missoula, Park, Ravalli, Richland, and Swan Valley; Common.

T. norvegica (Web.) Wahlenb. ex Lindb.

Arctic-alpine, soil, and rock; GNP; Uncommon.

**T. papillosa* Wils. ex spruce

Rock and soil; Sanders; Unknown status; 1 collection by G.L. Moore and P. Lesica deposited at MONTU.

T. princeps DeNot.

Rock and soil over rock; Flathead, GNP, Lincoln, and Ravalli; Unknown status.

T. ruralis (Hedw.) Gaertn.

Soil and soil over rock; Beaverhead, Carter, Fallon, Flathead, Gallatin, GNP, Golden Valley, Hill, Lake, Lewis and Clark, Lincoln, Madison, Missoula, Powder River, Rosebud, Sanders, Teton, and Valley; Common.

T. ruraliformis (Besch.) Dix.

Soil and rock; GNP, Lake, Flathead, Cascade, and Gallatin; Common.

T. subulata Hedw.

Pacific maritime, soil; Cascade, Flathead, and Swan Valley; Unknown status.

Trachybryum megaptilum (Sull.) Schof.

Pacific maritime, soil over rock; Lake and Lincoln; Rare; Edge of range in northwestern Montana.

Trichodon cylindricus (Hedw.) Schimp.

Soil; GNP and Lincoln; Unknown status.

Weissia controversa Hedw.

Soil; Carter, Flathead, GNP, and Roosevelt; Probably common.

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